Item #59: Insect and Disease

Evaluation Question: What is current insect and disease occurrence and what are trends in comparison to Forest plan Projections?

Resources to be measured:

- Acres of MPB mortality by year
- Acres of other bark beetle mortality by year

Data Sources:

- R1 aerial detection survey and reports
- Forest Service Aerial Detection Survey Maps

Survey and mapping has been completed for 2010 and numerical data reflects updates through 2010 surveys (2009 mortality).

Annual Regional monitoring of insect and disease activity (http://www.fs.fed.us/r1-r4/spf/fhp/conditions/entry1.html) occurs primarily as aerial detection surveys, followed by state-wide published condition reports, which include county and forest narratives and tabular data. Surveys are flown each summer with a fixed wing aircraft, with surveyors mapping infestations by pest, host tree species, and the number of current year fading trees. In some years, smoke or other factors will prevent a full survey of the forest. Further on-the-ground investigation may be conducted by forest or regional personnel to validate the more general aerial survey data.

Over time, the largest impact to the Flathead National Forest has been from bark beetles, primarily mountain pine beetle. The ecological role of mountain pine beetle (MPB) has been to cause widespread mortality in lodgepole pine stands, setting the stage for stand-replacing fire, and establishment of a new lodgepole pine forest. At the time of development of the Forest Plan in 1986, epidemic levels of MPB mortality were a primary driver of timber management goals and activities.

Summary data from the regional surveys shows that mountain pine beetle activity was at a peak on the Flathead National Forest in 1981, when 217,000 acres (more than 10% of the forest) were affected. Much of the lodgepole pine dominated forest experienced mortality, and salvage harvest was accelerated in that timeframe. Mountain pine beetle populations dropped in the early 1990s, estimated at a total of 1,200 acres of new mortality on the forest in 1990. However, in the last decade, populations are on the upswing again. The combination of prolonged drought, milder winters (leading to greater beetle survival from year to year) and increasing acreage of mature pine trees susceptible to mountain pine beetle attack, have set the stage for these increases. While much smaller in scale than mortality in the 1980s, MPB populations are building in Western Montana, and seem likely to continue to build over the next few years. Flathead National Forest 2007 survey estimated 40,000 acres with recent MPB caused mortality, with a slight drop in surveyed acres (representing mortality from the prior years) in 2008 and 2009. However 2009 mortality, as represented by 2010 mapping data, increased to approximately 73,000 acres.

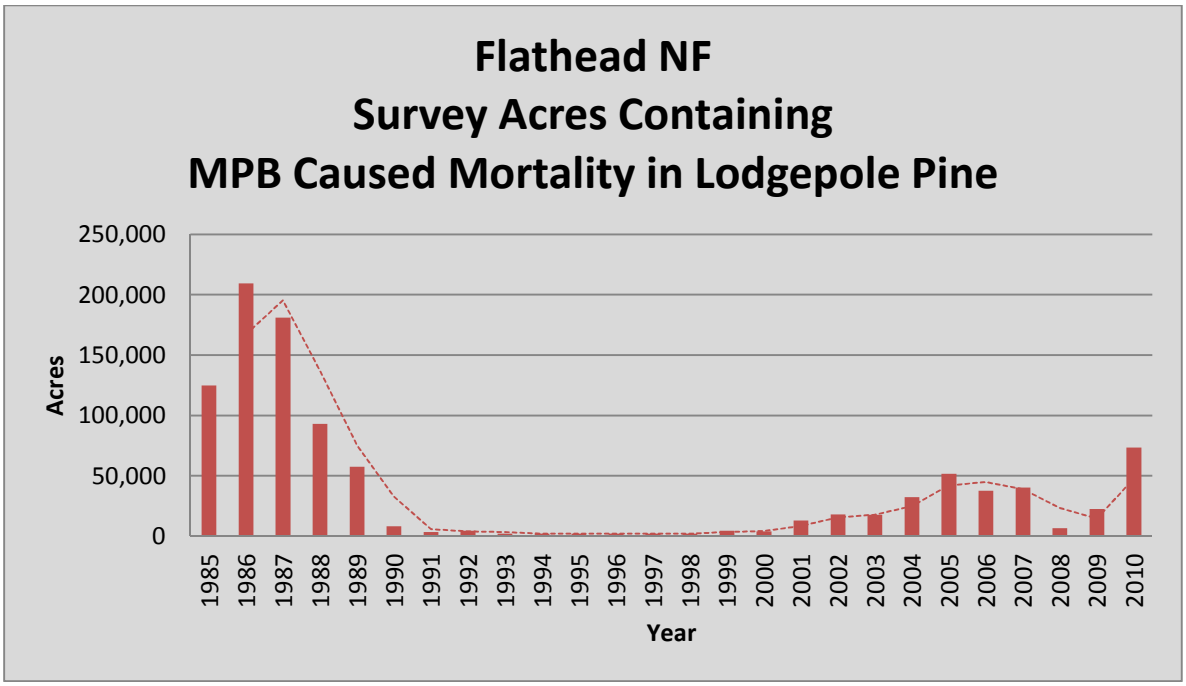

Figure 1: Acres Containing Mountain Pine Beetle Caused Mortality in Lodgepole Pine

Ponderosa pine, western white pine and whitebark pine are all susceptible to mountain pine beetle as well, but the scale of impacts on the forest is quite small. Aerial detection of this mortality, scattered within other timber species, is more difficult, and actual mortality may be underestimated.

Figure 2: Mountain Pine Beetle Mortality, Excluding Lodgepole Pine

Continuing bark beetle mortality in whitebark pine, in combination with white pine blister rust impacts, and fire suppression have altered the normal cycles of white bark pine forests. Long-term sustainability of these white bark pine (WBP) ecosystems appears to be at risk on the Flathead National Forest and across the region. Whitebark pine is a relatively rare species on the landscape, and plays an important ecological role in high elevation forests. Whitebark pine is a regional species of concern, and research and restoration projects, on a small scale, are on-going.

In 2010, increasing mountain pine beetle mortality has been found in ponderosa pine in the Swan Valley. This is a particular concern, as ponderosa pine is another relatively rare species across the forest. Dead ponderosa pine have been found in stand conditions not normally thought to be highly susceptible to MPB, namely large old relic trees, and younger plantations established about 40 years ago. Mortality in these areas is believed to be a result of the generally increasing "beetle pressure" from increasing MPB numbers in the Swan. As long as there is a considerable mature lodgepole pine susceptible to MPB, populations are likely to remain high, and ancillary mortality in other pine species can be expected.

Current mapping of MPB shows that generally the mortality on the forest is scattered across the landscape in individuals and clumps of less than 30 trees, rather than concentrated in large contiguous areas. The most concentrated areas of mortality have been identified on the eastern side of the Swan Valley, where numerous areas are mapped as polygons of 100 or more dead trees. Additional areas of concentrated trees are found near Spotted Bear and the Marias Pass area.

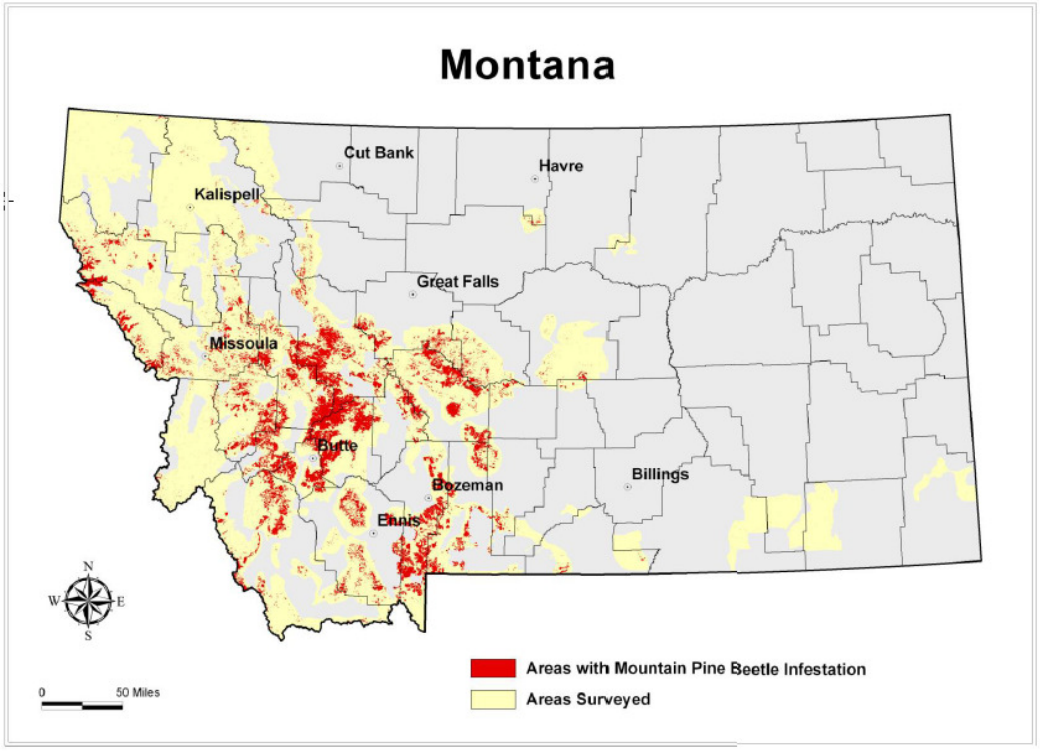

Figure 3: Map of Mountain Pine Beetle Infestation in Montana, 2009

Mortality from other bark beetles common to western Montana is displayed below. Total for all of these species was a maximum of 22,800 acres in 2004, was down to total of 2,360 acres in 2007, and back up to approximately 18,000 in 2008. Number in 2008 and 2009 are increasing again, as a result of fir engraver. In 2010, Fir Engraver and subalpine fir mortality represented the most significant mortality agent accounting for approximately 7,300 acres.

Douglas-fir beetle (DFB) populations declined through 2007, but are showed a slight increase in 2008. In 2009 and 2010 associated mortality has decreased again.

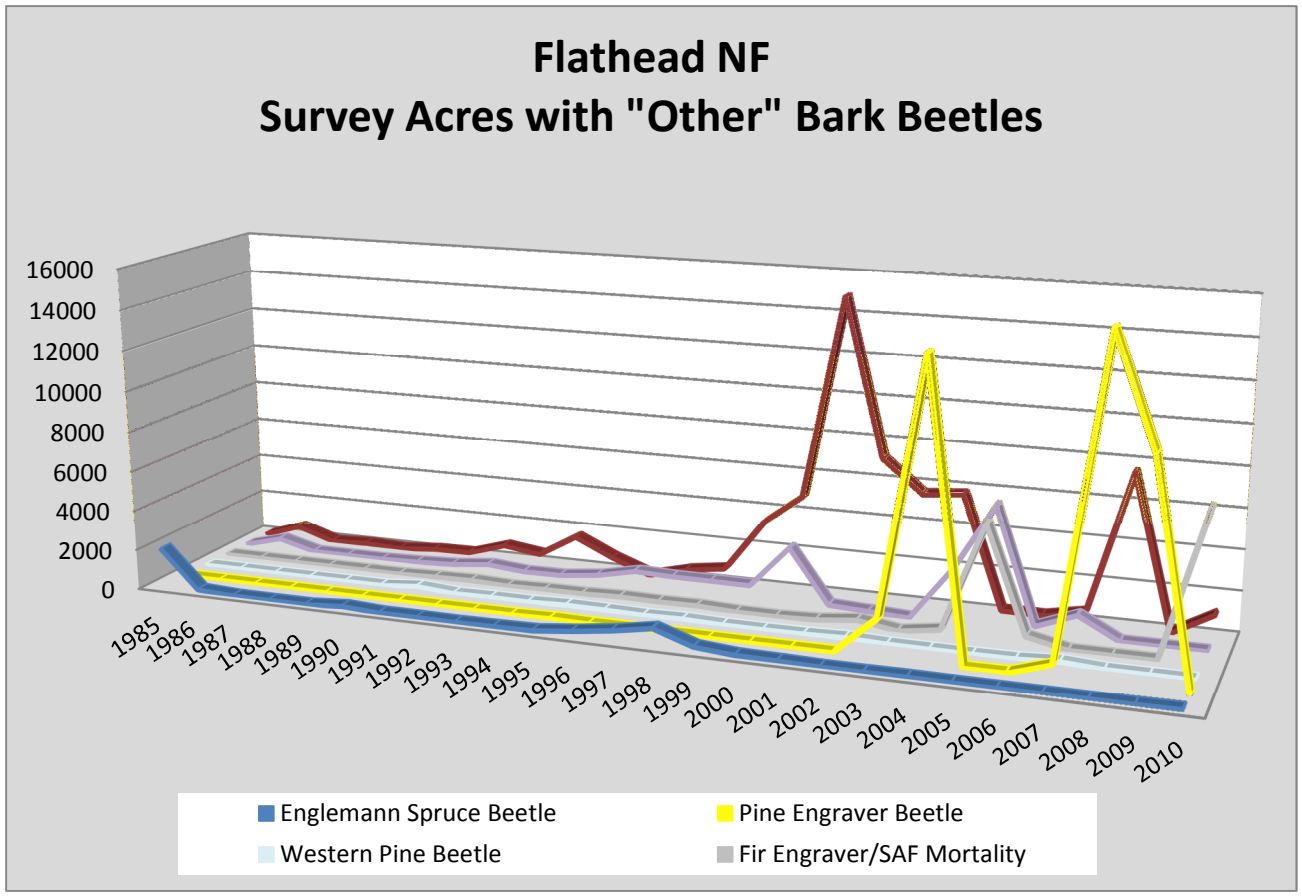

Figure 4: Acres of Other Bark Beetles on the Flathead NF, from 1985 to 2010

Western spruce budworm populations have mushroomed in 2009 and 2010. Surveyed acres were only 120 acres on the forest in 2008, but were surveyed at 199,000 in 2009 and 35,000 in 2010. This defoliator has very cyclic populations, and generally several years of consecutive defoliation plus drought are required to kill a significant number of trees. However the red foliage is very visible throughout the forest, and in the Flathead Valley.

Other insects common to Western Montana include defoliators such as Douglas-fir tussock moth and larch casebearer. Neither has caused significant mortality on the Flathead Forest in the last

decade. Additional pathogens impacting the forest include dwarf mistletoe, white pine blister rust, and root diseases. These agents are all present on the forest. They generally affect tree growth, but can result in tree mortality.

The forest will continue to be susceptible to future insect and disease activity. Most of these occurrences are cyclic with weather and vegetation conditions. These agents of change are integral parts of forest ecosystems, often setting the stage for fire and establishment of new forests. However, high levels of insect and disease mortality may not be compatible with other forest plan objectives for wildlife cover, fuel loadings, and sustained levels of forest products.

Recommended Actions: Continue to monitor. Consider redesign of this monitoring item during Forest Plan revision. Data from FIA and forest health monitoring are becoming integrated, and should provide a more statistically accurate and repeatable picture of forest health conditions over time. Continue to emphasize and support white bark pine and ponderosa pine restoration efforts on the forest.